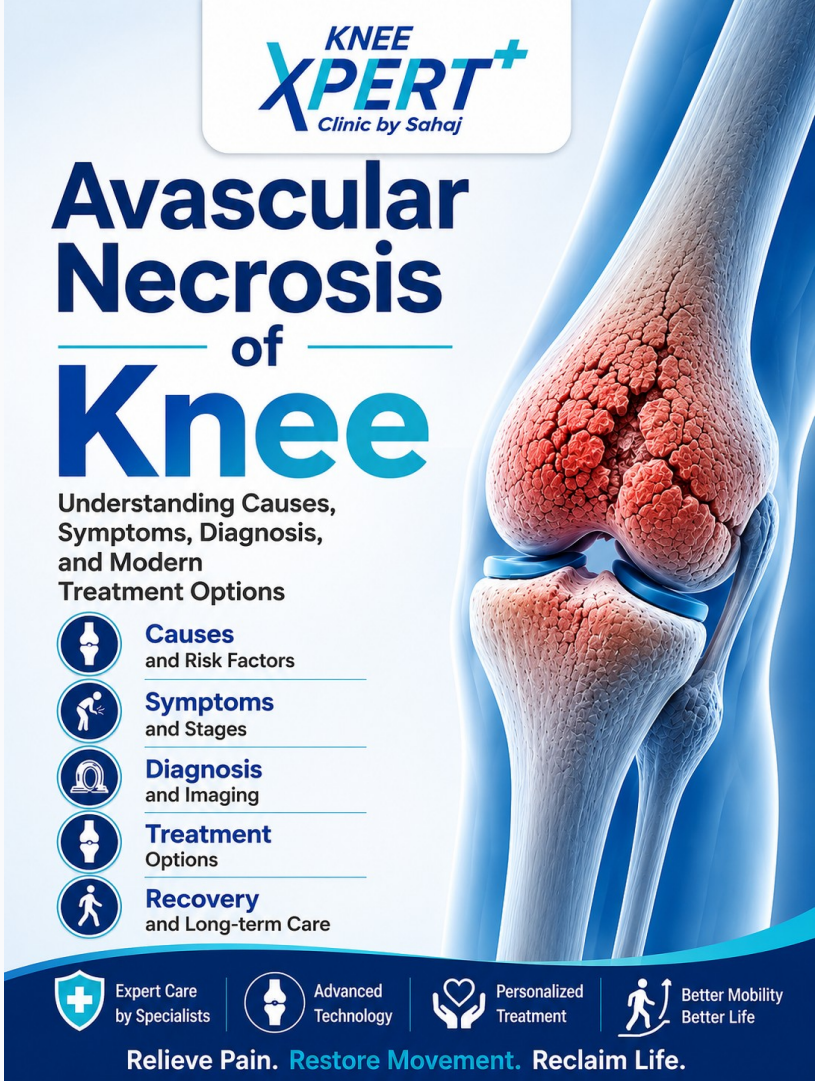
# Avascular Necrosis of Knee

Understanding Causes, Symptoms, Diagnosis, and Modern Treatment Options

Educational Presentation by KneeXpert
https://kneexpert.in/



# WHAT IS AVASCULAR NECROSIS (AVN)?

## Condition

A medical condition where blood supply to the knee bone reduces or stops, causing bone tissue damage and cell death.

## Impact

Lack of blood flow leads to gradual bone weakening and eventual collapse of the joint surface, causing severe pain.

## Affected Areas

Primarily affects the Thigh bone (Femur) and Shin bone (Tibia). The Kneecap (Patella) is involved in rare cases.

Bone Tissue Death

Reduced vascularity leads to structural failure of the knee joint.

**Also Known As:**

- Osteonecrosis
- Knee AVN

# WHY DOES KNEE AVN HAPPEN?

## Primary Causes

- Steroid medication overuse (Corticosteroids)
- Excessive alcohol consumption
- Trauma or severe injury to the knee joint
- Fractures near the joint disrupting blood flow

## Medical Risk Factors

- Blood clotting disorders (Thrombophilia)
- Autoimmune diseases (Lupus, RA)
- Sickle cell disease or Gaucher disease
- History of organ transplants or chemotherapy

**Idiopathic AVN**

In some cases, no exact cause is found. This is known as idiopathic Avascular Necrosis.

# SYMPTOMS OF KNEE AVN

## Early Stage

- Mild, intermittent knee pain
- Discomfort during weight-bearing
- Pain while climbing stairs
- Occasional joint stiffness

## Progressive

- Persistent pain even at rest
- Visible swelling around the knee
- Reduced range of motion
- Difficulty standing for long periods

## Advanced

- Noticeable limping while walking
- Joint instability or "giving way"
- Severe mobility restriction
- Knee joint collapse (structural)

Symptoms often worsen as the bone structure continues to deteriorate without treatment.

# STAGES OF KNEE AVN

## 01

### Early Stage

- Blood supply disruption
- X-ray appears normal
- MRI detects early disease

## 02

### Progression

- Bone structure changes
- Increased pain levels
- Visible on imaging

## 03

### Bone Collapse

- Bone collapse starts
- Uneven joint surface
- Significant discomfort

## 04

### Advanced

- Severe arthritis
- Joint destruction
- Functional limitation

Early diagnosis is critical to slow disease progression and preserve joint function.

# HOW IS KNEE AVN DIAGNOSED?

## Clinical Evaluation

- Assessment of pain patterns and duration
- Evaluation of walking ability and gait
- Physical exam of joint range of motion
- Review of medical history and risk factors

## Imaging & Lab Tests

- X-Ray: Identifies bone collapse in later stages
- CT Scan: Evaluates structural bone damage
- Blood Tests: Screen for clotting or autoimmune issues
- Bone Scan: Used if MRI is not possible

### MRI: The Gold Standard

Magnetic Resonance Imaging is the most sensitive test for early AVN detection, often identifying the condition before it appears on X-rays.

# NON-SURGICAL TREATMENT OPTIONS

## Conservative Management

- Activity modification to reduce joint stress
- Weight management and nutritional support
- Specialized physiotherapy and strengthening
- Knee support, braces, or offloading devices
- Targeted pain management medications

## Joint Preservation Approaches

For selected early-stage patients, advanced biological options may be considered:

- Core Decompression: Relieving internal bone pressure to restore flow.
- Biologic Therapies: Using cellular treatments to promote healing.
- Bone Grafting: Supporting structural integrity of the joint.

**Treatment selection depends on patient age, disease stage, and specific bone involvement.*

# SURGICAL TREATMENT OPTIONS

## When Surgery is Necessary

- Bone collapse has occurred (Stage 3/4)
- Severe pain unresponsive to medication
- Significant impact on daily activities
- Development of secondary arthritis

## Common Procedures

**Core Decompression**

Relieves internal bone pressure and stimulates new blood vessel growth.

**Osteotomy**

Bone realignment to shift weight away from the damaged area.

**Knee Replacement**

Partial or Total replacement for end-stage joint destruction.

*Modern surgical planning focuses on preserving mobility and improving the patient's overall quality of life.*

# RECOVERY AND LONG-TERM MANAGEMENT

## Recovery Success Factors

- Disease stage at diagnosis
- Type of treatment performed
- Patient's overall health status
- Rehabilitation compliance

## Essential Measures

- **Structured Physiotherapy:** Targeted exercises to restore joint function.
- **Muscle Strengthening:** Supporting the joint through improved stability.
- **Weight Control:** Reducing mechanical stress on the knee joint.
- **Follow-up Imaging:** Regular monitoring to track bone health.

Early intervention often improves long-term outcomes and joint preservation.

# SUMMARY AND KEY TAKEAWAYS

### Blood Supply is Key

AVN is fundamentally a loss of blood supply to bone tissue, leading to structural failure.

### Early Detection

MRI remains the gold standard for early diagnosis before irreversible bone collapse occurs.

### Joint Preservation

Early-stage treatment focuses on saving the natural joint through biological and conservative means.

### Expert Consultation

Timely orthopedic evaluation is crucial for managing progression and maintaining long-term mobility.

## Thank You!

**KNEE XPERT**

Advanced Joint Care & Preservation